

**SETTLE, ROTATIONAL/LINEAR VIBRATION, AND TRACK  
FOLLOW CONTROLLER OPTIMIZATION WITH SHARED STATE  
CONTROLLER**

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**Abstract of the Disclosure**

A shared state controller is provided that optimizes for settle, rotational vibration, and track following. The shared state controller uses the same state update equation with different output equations for settle and track follow. Two or more different track follow output equations may also be used. Switching logic determines which output equation to use in the controller. The shared state controller switches between a settle controller and a track follow controller based on the state of the actuator. In addition, the shared state controller may also switch between two or more track follow controllers based upon other parameters.